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Lower bounds for the Hilbert transform

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In a recent paper Alaifari, Pierce & S. Steinerberger conjectured a lower bound for the Hilbert transform H of the form

$$\|Hf\|_{L^2(J)} \geq \exp(-c_{I,J} \|f'\|_1 / \|f\|_2) \|f\|_{L^2(I)}$$

when I, J are disjoint intervals and $f \in L^2, f' \in L^1$.

The aim of this talk is to present the motivation of this conjecture as an invitation to study lower bounds for Calderon Zygmund operators.

We will then switch to the dyadic Hilbert transform as a toy model for the above conjecture.

In this case, the problem has been entirely solved in my paper with E. Pozzi and B. Wick [2].

Refs

[1] Alaifari, Pierce & Steinerberger
Lower bounds for the truncated Hilbert transform. Rev. Mat. Iberoamericana 32 (2016), 23–56.)

[2] Ph. Jaming, E. Pozzi & B.D. Wick
Lower bounds for the dyadic Hilbert transform
Annales de la Faculté des Sciences de Toulouse (to appear)
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